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SNOW SURVEY and WATER SUPPLY FORECASTS

for

MONTANA & NORTHERN WYOMING

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE, and
MONTANA AGRICULTURAL EXPERIMENT STATION

In cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, U.S. Bureau of Reclamation, State Engineers of Montana and Wyoming and other Federal, State and private organizations.

FEB. 1, 1959

#### UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY AND WATER SUPPLY FORECAST REPORTS:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1300 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

#### PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS RIVER BASINS	ISSUED	COOPERAT	TING WITH	LOCATION
Colorado, Rio Grande	MONTHLY (FEBMAY),	COLO. STAT	STATIONFT. FE ENGINEER STATE ENGINEER	. Collins, Colo.
COLUMBIA Includes Alaska	MONTHLY (JAN MAY)	I DAHO STAT	re Engineer	Boise. Idaho
UPPER MISSOURI	MONTHLY (FEBMAY)	Mon T. AGR. E	XP.STATION	Bozeman, Montana
WEST-WIDE	(OCT. 1, APR. 1 AND MAY 1)	COOPERATOR	sl	Portland, Oregon
STATES				
ARIZONA	SEMI-MONTHLY(JAN. 15-APR.1)	SALT R. VAI		PHOENIX, ARIZONA
NE VADA	MONTHLY (FEBAPR.)	NEVADA STA	TE ENGINEER	RENO. NEVADA
OREGON	MONTHLY (JANMAY)	ORE.AGR.EX	P.STATION	PORTLAND, OREGON
UTAH	Monthly (JanMay)	UTAH STATE UTAH AGR.E:	ENGINEER XP.STATIONSAL	T LAKE CITY, UTAH
Washington	MONTHLY (FEBMAY)	Wash. Stati	E DEPT. ATIONSPOI	KANE. WASHINGTON
WYOMING	MONTHLY (FEB JUNE)	WYOMING ST	ATE ENGINEER	CASPER, WYOMING
Copies of the	e various reports may be s	secured from:	Head, Water Supply Fore Soil Conservation Servi 209 S.W. 5th Avenue, Po	ce

#### PUBLISHED BY OTHER AGENCIES

0.	HER SNOW SURVEY REPORTS	
	BRITISH COLUMBIA MONTHLY	(FEBJUNE)
	CALIFORNIAMonthly	(FEBMAY)CALIFORNIA DEPARTMENT OF WATER RESOURCES,



#### FEDERAL-STATE-PRIVATE COOPERATIVE

SNOW SURVEYS and WATER SUPPLY FORECASTS

for

MONTANA AND NORTHERN WYOMING

(Upper Missouri and Upper Columbia River Basins)

Report Prepared by:

A. R. Codd Hydraulic Engineer Soil Conservation Service

Soil Conservation Service
U. S. Department of Agriculture
and
Montana Agricultural Experiment Station
Bozeman, Montana

Report Issued by:

H. D. Hurd State Conservationist of Montana O. W. Monson
Irrigation Engineer
Montana Agricultural
Experiment Station

R. E. Huffman Director Montana Agricultural Experiment Station



#### WATER SUPPLY OUTLOOK FOR MONTANA February 1, 1959

* * * * * * * * * * * * * * * * * * * *	*
*	*
* The 1959 February first snow-pack on the Missouri Basin	×
* in Montana indicates a water supply of 86 to 96 percent	
* average.	*
*	*
* On the Columbia Basin in Montana the 1959 February first	<b>է</b> %
* snow-pack is 99 to 120 percent average.	*
*	*
* Reservoir Storage is good for February first on the	*
* Missouri Basin and slightly above average on the	*
* Columbia Basin.	*
*	兴
* * * * * * * * * * * * * * * * * * * *	*

#### MISSOURI RIVER BASIN

#### JEFFERSON RIVER

Snow-Survey courses measured on the southern watershed of the Beaverhead reflect apparent drought conditions in eastern Idaho. The snow-pack on the Beaverhead is 56 percent average. Farther north on the Big Hole River basin the snow-pack is close to 90 percent average. These conditions are very similar to last season.

#### MADISON RIVER

The 1959 February snow-pack on the Madison River is less percentage-wise than on the Beaverhead. The seven snow-survey courses measured on the Madison indicate only 72 percent average. This condition is only 3 percent less than February 1958.

#### GALLATIN RIVER

The 1959 February snow-survey measurements indicate an excellent water supply from this river. These courses show the snow-pack to be 105 percent of last year and 103 percent of the 1938-52 average.

#### MISSOURI RIVER MAIN STEM

Tributary basins entering the Missouri River from Toston to Fort Benton have a snow-pack 12 percent above last year and 96 percent average.

All indications point to a GOOD water supply from the snow-pack in the mountains for the 1959 season.



#### COLUMBIA RIVER BASIN

#### FLATHEAD RIVER

The 1959 February snow-pack on the South Fork and Middle Fork of the Flathead River is 140 percent of last year and 120 percent average. February indications are very good and should insure an adequate water supply for the 1959 season.

On the Clark Fork Basin the February snow-pack is 104 percent of last season and 105 percent average. This February snow-pack should produce a GOOD water supply.

#### KOOTENAI RIVER

Snow-Survey measurements furnished by the Division of Water Rights in British Columbia indicate that there is an adequate snow-pack on the Upper Kootenai River. Measurements show the February snow-pack to be 106 percent of last season and 99 percent of the 1938-52 average.

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# INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

Drainsge Basin and Course Name JEFFERSON RIVER	Montana Number	Elev.		Top.  ER DRAIN	Range Long.	Record Began	Heasuring	Heasured By	Drainage Basin and Course Name	Montens Number	Elev.	Location Sec. Lat. RIVER DRA	Twp.	Range Long.	Record Began	Measuring Dates	Measured By	Drainage Basin and Course Name	Montana Number	Elev.	Loceti Sec. Lat.	Twp.	Long.	Record Began	Measuring Datee	Moasured By
(ROCK-BEAVERH	EAD)								(UPPER YELLOW	(anote								(TONGUE RIVER	cont.)							
Lakeviev Ridge Lakeviev Canyon Limekiln White Pine Ridge	11E3 11E4 12E2 12E1	7400 6930 6950 8850	27 26 5 18	14s 14s 15s 14s	2W 2W 9W 9W	1948 1948 1948 1948	3,4,5 3,4,5 3,4,5	10 10 1	Camp Senia Canyon Cooke City Crevice Mt.	9D1 10E3 10D7 10D5 10D6	7890 7750 7400 8400 8000	2 144.*-444.1 25 22 22	8S 9S 9S 7S	185 110°-30° 145 95 126	1937 1938 1937 1935 1940	1,2,3,4,5 1,2,3,4,5 3,4	1 6 6 2	Horee Trail Div. Lake Geneva North Tongue Sibley Lake	7E19 7E16 7E15 7E11	9200 9000 8800 8000	29 7 17 10	55N 52N 55N 55N	90W 86W 89W 88W	1956 1956 1956 1956	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	1 1 1
(HORSE PRAIRI	<u>g</u> )								Independence Lake Camp	10E1	7850 7300	44°-341 44°-541	19	110°-241	1936	1,2,3,4,5	6	Sucker Creek Steamboat Point	7E12 7E10	9000 7500	19 32	55N 56N	87₩ 87₩	1956 1956	2,3,4,5 2,3,4,5	1
Floody Dick Gold Stone Lemhi Pass Terrell Creek Trail Creek	13D10 13D9 13E1 13D12 13E2	7600 8100 7480 6650 7090	12 11 9 14 15	8s 8s 10s 9s 10s	16W 16W 15W 15W	1948 1948 1948 1948 1948	3,4 3,4 3,4 3,4 3,4	1 1 1 1	Lupine Creek Lodgepole (SHIELDS RIVE Porcupine	9E1	6500	32	56n 4n	106W	1938 1940	1,2,3,4,5 2,3,4,5	1,4	Vood Rock G.S.  (POWDER RIVER  Crazy Woman Muddy Creek G.S.	6E2 6E1	8500 8200 7800	6 2	54N 47H 48N	88w 8lin 8lin	1956 1956 1956	2,3,4,5 2,3,4,5 2,3,4,5	1 1 1
Selway Junction	13011	6800	27	88	15W	1948	3,4	1	LOWER TELLOWSTONE									Munkere Pase North Powder #2	7E8 7E36	9700 8300	11 20	18N 17N	85¥ 85¥	1950 1956	2,3,4,5 2,3,4,5	1
(BIO HOLE)	3.202	701.0	28	38	18W	1948	2.1.	,	(WIND RIVER)	Wyoming								Onion Gulch Soldier Park	7£27 7£5	8100 8700	31 36	27N 23N	85W 85W	1956 1950	2,3,4,5	1
Rig Hole Pass-Be Big Hole Pass-Be. Bast Boundary Cibbons Pass Jahnke Greek Miner Forks Miner Lake	1303 1304 1305 1302 1308 1306 1307	7240 6900 6700 7100 7340 7300 6720	24 22 4 25 24	3S 3S 2S 7S 6S 6S	18W 17W 19W 16W 17W	1948 1948 1948 1948 1948 1948	3,4 3,4 3,4 1,2,3,4,5 3,4 3,4 3,4,5	1 1,3 1	Big Ware Brooke Lake #3 Burroughs Creek Dinwoodie Dry Creek DuNoir	9F12 10F8 9F4 9F10 9F9 9F6	8800 9200 8800 10000 9500 8750	36 23 15 21 34 27	42N 44N 43N 39N 4N 42N	109W 110W 107W 105W 6W 108W	1955 1939 1948 1948 1948	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	1 1 1 1	Sour Dough  KOOTLNAI RIVER Baree Creek	7E6	8500 COL	17 UMBIA RI 6	49N VER BASI 25N	30M N 8fm	1936 1956	2,3,4,5 4,5,5	1
(WISE RIVER)							- , , ,		East Fork Geyser Creek	9F13 9F7	9200 8500	23 12	LLIN LLIN	104W 108W	1956 1948	2,3,4,5	1	Baree Mountain Red Mountain	15B1 15A1	6000	1	25N 36N	31W 29W	1937 1937	4,5,5	1,2
Anderson Hdw. Elk Roro Wise River	13D14 13D15 13D13	7000 8450 6300	18 15 15	3S 4S 2S	12W 12W 12W	1948 1935 1948	3,4 3,4,5 3,4	1 3 1	Little Warm Sheridan R.S. #1 Sheridan R.S. #2 T-Croes Ranch	978 975 971 973	9500 7500 7500 8000	24 3 3	42N 42N 43N	108W 109W 109W 107W	1948 1939 1955 1940	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	1 1 1	Weasel Divide  FLATHEAD RIVER  Basin Creek	13B14A	51450 5000	ž 11	37N	24W	1955	3,4,5,5 4,5,5 2,3,4,5	1,2
(RUBY RIVER)									Togwotee Pass	1079	9600	29	μŢΨ	110M	1936	2,3,4,5	n	Big Creek Brush Creek	1383 1444	6750 5000	6&7 13	22N 30N	18₩ 26₩	1941 1937	3,4,5 3,4,5	5 1,2
Flashlight	1203	6950	22	88	Ţ₩	1945	3,4,5	1	(POPO AGIE RI	_		2.2	22.81	1014	1030	221.0	,	Cattle Queen Decert Mountain	13A1 13A2M	14700 5600	7 24	35N 31N	17W 19W	1939 1937	3,4,5 1,2,3,4,5	6 1,2
MADISON RIVER									Blue Ridge Bruce's Camp Hobb's Park	802 805 903	9500 6500 10000	23 24 22	31N 32N 2S	101W 101W 3W	1939 1955 1948	2,3,4,5 2,3,4 2,3,4,5	1	Hell Roaring Div. Holbrook	13B13A	5770 4530	35 18	32N 21N	22W 13W	1942 1951	3,4,5 1,2,3,4,5	1,2
Kebgen	11E5	6550	22	113	3E	1934	1,2,3,4,5	3	Mosquito Park R.S Sawmill Olade		9500 8500	23	2S 31N	3W 101W	1940 1940	2,3,4,5	1	Liehenehn Logen Creek	1446 1445 1345N	3886 4300	ᅫ	37H 30N	57A 57A 55A	1954	3,4,5	2
West Yellowstone Norris Basin	11E7 10E2	6700 7500	34 44°44°	13S	1100-42°	1934	1,2,3,4,5 3,4	3	South Pass St. Lawrence	803 9 <b>F11</b>	9000	13 26	30N 1N	101W	1939 1940	2,3,4,5 2,3,4,5	1	Marias Pase Hineral Creek Quintonkon	13A16 13A13	5250 4000 3800	34 29 11	30N 35N 26N	17W 17W	1934	1,2,3,4,5	6
									Trout Creek (OWL CREEK) W	902	8400	5	25	2W	1948	2,3,4,5	î	Spotted Bear Mt. Strawberry Lake	13B2H 13A10	7000	23	25N 28N	15W 19W	1951 1948 1948	2,3,4,5 3,4,5	1,2 1,2 2
CALLATIN RIVER									Beavere Mill Owl Creek	9 <b>P2</b> 8 <b>P</b> 1	8900 8700	6 36	43N 43N	101W	1948 1948	2,3,4,5 2,3,4,5	1	Trinkus Lake Trout Lake Truin Creeks Upper Holland Lk.	13B1 13A12M 13B11	6500 3600 3580 7000	9 21 14 28	25N 28N 26N 26N	17W 17W 16W 16W	1948 1948 1951 1948	3,4,5 3,4,5 3,4,5 2,3,4,5 3,4,5	1,2 1,2
Devil'e Slide Hood Maado≌	1004 1003	8100 6600	14 22	5S 4S	6E 6E	1935 1935	2,3,6,5 2,3,4,5	2,1 2,1	(CREYBULL RIV	ER) ⊌yoming	3							CLARK FORK		,			20	-7/4-	21412	•
New World 21-Mile	10D1 11E6	6700 7150	24	35 115	GE SE	1939 1934	1,2,3,4,5 1,2,3,4,5	7 3	Timber Creek #1 Timber Creek #2 Wood River #1 Wood River #2	9E2 9E3 9F1 9F15	8800 8800 8000 8000	25- 25 28 28	47x 47x 46n 46n	103W 103W 103W 103W	1948 1955 1939 1956	2,3,4,5 2,3,4,5 2,3,4,5 2,3,4,5	1 1 1	Baree Creek Baree Mountain Coyote Hill El Dorado Mine	15811 1581 13810 1309	5500 6000 4200 7800	6 1 12 23	25N 25N 18N 8N	30W 31W 16W 12W	1956 1937 1952 1949	4,5,5) 4,5,5) 1,2,3,4,5	2 2 2
MISSOURI RIVER HAI									(SHOSBONE RIV							-,,,,,,		Fred Burr Pass Freezeout Summit	13011 15810	8000	12	6N 15N	13W 27W	1957 1937	3,4,5 4,5	1 2
Chessman Recervoir Crystal Lake Grasshopper Kings Hill Picnic Grounde	1205 901 1002 1001; 1206	6200 6100 7000 7950 6500	19 19 35 10	8n 12n 9n 13n 5n	5W 16E 8B 7E 6W	1936 1941 1938 1934 1941	1,2,3,4,5 3,4 3,4 3,4,5 2,3,4	3 1,2 2 3 h	East Entrance Sylvan Pass (NOWOOD CPEEK	10E6 10E5	7000 7100	17 12	52N 52N	109W 110W	1948 1936	1,2,3,4,5	6	Oold Creek Lk. Hoodoo Creek Intergaard Lubrecht Forest # North Fork Jocko	13010 1501 1304	7200 6200 6450 4400 6330	11 9 6 11 3	8n 14n 5n 14n 17n	12W 27W 13W 15W 17W	1949 1937 1936 1951 1941	4,5 4,5 2,3,4 1,2,3,4,5 3,4,5	1 2 4 12
Pipestone Pass Stemple Pass	12D1 12C1	7200 6900	11 16	אר 13א	7W 7W	1938 1934	2,3,4,5 3,4,5	3	Cold Springs Camp		8700	1	SON	68¥	1956	2,3,4,5	1	Pipestone Pase	1201	7200	10	1N	T₩	1938	2,3,4,5	1
Ten Mile Creek L Ten Mile Creek M	12C2 12C3	6250 6800	13 13	8n 8n	6W	1935 1934	1,2,3,4,5	3	Medicine Lodge Lko Munkers Pass		9500 9700	7 11	51N 48N	87W 85W	1956 1950	2,3,4,5	1	Red Lion Slide Rock Mt.	13012 1302	7000 7100	27 35	6N 10N	13W 16W	1958 1937	3,4,5	1
Ten Mile Creek U	1204	8000	19	8n	5W	1935	1,2,3,4,5	3	North Powder Onion Gulch	7E36 7E27	8300 8100	20 31	47% 48N	85W	1956 1956	2,3,4,5	1	Southern Croes Stemple Pase	1305 1201	6500 6900	8	5N 13N	13W 7W	1936 1934	2,3,4 3,4,5	4
(TETON RIVER)  Freight Creek	2042	6000	,,	0(1)	2011				Tensleep Lake Tensleep R.S.	7E26 7E7	9075 8300	33 30	50N 49N	86W 86W	1956 1935	2,3,4,5	1	Storm Lake Stuart Hill	1307 1306	7780 6500	19 19	LIN SN	13W 13W	1939 1936	2,3,4 2,3,4	1 4
Waldron Creek	12A1 12B2 12B1	6000 5600 6000	13 16 6	26N 25N 25N	10W 9W 9W	1948 1948 1948	3,4 3,4 3,4	1	Tyrell R.S.	7E35	8300	30	49N	86W	1956	2,3,4,5	1	Stuart Mountain TV Mountain	1301 14B1	7400 6800	6 33	14N 15N	18₩ 19₩	1936 1956	1,2,3,4,5	1,2
(SUN RIVER)	12.02	0000	o	2211	УW	1940	3 <sub>9</sub> 4	1	(SHELL CREEK)		0/00		er / 11	0.11	2041			East Fork R.S.	13D1	5400	16	2N	17W	1937	4	1
Benchmark	1288	5500	9	20N	10W	1948	3.4	1	Beld Mountain Beaver-Tongue Div Bone-Spring Div.	7E21 7E20 7E18	9600 9200 9200	33 12 32	56N 55N 55N	91W 91W 89W	1956 1956 1956	2,3,4,5	1	Cibbons Pass Lolo Pass	1302	7100 5230 5580	16	2S 38N 1S	19W 15E	1934 1956	1,2,3,4,5 3,4,5,5	3,1
Cabin Creek 5-Bull	12B6 12B9	5600	33 36	23N 20N	10W	1949 1948	3,4 3,4 3,4 3,4	1,2 1,2	Granite Creek Cam Granite Pase		7800 8950	15 19	53N 54N	89W 88W	1956 1956	2,3,4,5 2,3,4,5 2,3,4,5	1	Nez Perce Camp Nez Perce Pass Powell R.S.	14D2 14D1 14C6	6575 4230	19&20 32 33	28 N 37 N	23W 17E 14E	1937 1937 1956	3,4,5 1,2,3,4,4,3,5	
Gatee Park Gost Mountain	1285 1287	5300 7000	31 20	22N	10W 10W	1949 1934	3,4 3,4	1,2	Horse-Trail Div. Ranger Creek	7E19 7E4	9200 8800	29 32	55N 53N	90W 88W	1956 1935	2,3,4,5	li 1	Skalkaho Summit	1303	7259	30	6N	17₩	1937	3,4,5,5 <u>1</u>	1
Wrong Ridge Wrong Creek	1283 1284	6800 5700	17 32	25N 25N	10W	1949 1949	3,4 3,4	1,2	Shell Creek	7E23	9600	12	52N	88W	1956	2,3,4,5	î			SAS	SKATCHEW	AN RIVER	BASIN			
" (MARIAS RIVER)	)								(PORCUPINE CRI	EEK) Wyomir	vg							ST. MARY RIVER								
Harias Pass	13A5H	5250	34	30N	TIM	1934	1,2,3,4,5	3	Five Spge. Falls Medicine Wheel	7E31 7E30	7500 9000	19 24	56N 56N	92₩ 92₩	1956 1956	2,3,4,5	1	Iceberg Lake #3 Josephine Upper	13A3 13A15		480-501		1130-43 °	1922 1956	5	3,9
(MILE RIVER)									(TONGUE RIVER									Josephine Lower #		4900	480-471		1130-41	1955	5	3,9
Rocky Boy	941	5200	15	28N	16E	1941	3,4	7	Beaver Tongue Div	, 7E20	9200	12	55N	91W	1956	2,3,4,5	1	Piegan #6 Ptarmigan #8	13A6 13A8	5500	480-463	•	1130-41 <del>4</del> 1130-41 <del>4</del>	1922	5 5	3,9 3,9
(MUSSELSHELL RI	IVER)								Big Goose #1 Big Goose #2	7E2 7E32	7700 7700	4	53N 53N	W38	1935 1955	2,3,4,5	1									
Orasehopper	1003	7000	19	9n "	8E	1938	3,4	2	Bone-Spring Div. Burgese R.S. #1 Burgese R.S. #2	7E18 7E1	9200 7900	32 36	55N 56N	89₩ 89₩ 80₩	1956 1950	2,3,4,5	1	a. Numerals 1,2,	3,4 and 5	refer to	January	l, Febru	ery 1, K	arch 1,	pril 1 and Ma	у 1.
									Dome Lake #1 Dome Lake #2	7£33 7£3 7£34	7900 8800 8800	36 11 11	56N 53N 53N	89¥ 87¥ 87¥	1955 1950 1950	2,3,4,5 2,3,4,5 2,3,6,5	1 1	b. Numerals refe	r to Agenc	y that sec	urse th	e enow s	urvey #s	follows		
									Cloom Creek Cranite Pase	7E11, 7E17	9300 8950	32 19	55N 55N	87W 88W	1956 1956	2,3,4,5 2,3,4,5 2,3,4,5	1	1. Soil Conservat		ce					periment Stat	ion
From trop-stilleles, a policie i cosa										1511	V/30	17	Леп	Ç JA	1770	2,3,4,5	1	2. U. S. Forest S 3. U. S. Geologic 4. Hontana Power 5. U. S. Indian S 6. National Park	cal Survey Company Service	В -	Soil Ho		9. Do	. S. Plah . S. Bure	ster & Power and Wildlife au of Reclama ate Forestry	Service tion



## COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow-Survey Data by Tributary Watersheds February 1, 1959

TRIBUTARY BASINS	No. of Courses Averaged	No. Years Used			r Equivalent ercent of Average
	IIV OI agoa	OBCG			SVOI 450
·	MISSOURI RIVER E	ASIN IN	MONTANA		
JEFFERSON RIVER	4	15	96	91	86
MADISON RIVER	7	9 <b>-</b> 15	97	67	72
GALLATIN RIVER	14	5-15	105	106	103
MISSOURI MAIN STEM	5	15	112	128	96
UPPER YELLOWSTONE	6	11-15	120	9 <b>2</b>	85
	COLUMBIA RIVER B	ASIN IN	MONTANA		
KOOTENAI RIVER ABOVE LIBBY	6	8-15	106	98	99
FLATHEAD RIVER	8	8-15	140	145	121
UPPER CLARK FORK	15	7-15	104	115	105



					SNOW C	OVER M	EASURE	ŒNTS	
MISSOURI				1959			ast Rec		Total
DRAINAGE BASIN			Date	Snow	Water	Water	Conter		Years
AND SNOW COURSE	No.	Elev.	of Survey	Depth (In.)	Content (In.)	1958	1957	15-Year Average 1938-52	of Record
JEFFERSON RIVER									
(Rock-Beaverhead) #Camp Creek #Kilgore (Big Hole)	12E3 11E12	6800 6200	1/30 2/1	19 21	3.9 3.6	5.0	7.2	6.4 7.3	21 22
Gibbons Pass #Moose Creek Storm Lake #2	13D2 13D16 13C7	7100 6200 7780	1/30 1/28 2/3	55 43 36	14.2 10.3 8.8	14.4 10.7 7.9	14.8 11.2 7.6	15.2* 11.8** 8.4**	19 13 6
MADISON RIVER									
Hebgen Norris Basin 21-Mile W. Yellowstone #Big Springs #Island Park #Valley View	11E5 10E2 11E6 11E7 11E9 11E10 11E8	6550 7500 7150 6700 6500 3600 6500	1/31 1/29 2/1 1/31 1/31 2/1 1/31	30 29 38 26 45 35 32	6.2 5.4 8.8 5.0 10.8 6.8	5.9 5.3 8.6 4.2 10.8 9.7 6.5	10.0 6.6 13.5 9.1 14.5 10.4 10.5	7.6 7.5** 11.4 8.0 12.8 10.1 9.7**	2l <sub>4</sub> 9 21 21 23 23 13
GALLATIN RIVER					;		; , ,		
Devil's Slide Hood Meadow New World 21-Mile	10D4 10D3 10D1 11E6	8100 6600 6700 7150	1/31 2/1 2/24 2/1	55 27 26 38	14.6 6.6 6.4 8.8	12.6 7.3 6.2 8.6	- 5.4 13.5	12.0** 5.1** 6.8** 11.4	5 5 11 21
MISSOURI RIVER MAI	N STEM								
Chessman Res. Picnic Grounds Pipestone Pass Tenmile, Lower Tenmile, Middle Tenmile, Upper (Marias River)	1205 1306 12D1 1202 1203 1204	6200 6500 7200 6250 6800 8000	1/29 2/2 2/2 2/1 2/1 1/31	11 12 20 32 40	2.3 1.7 2.2 4.6 7.8 10.6	2.3 2.4 3.2 3.9 6.4 8.2	1.2 3.8 3.2 4.4 5.8 7.7	3.3 3.4** 2.9* 4.8 7.0 8.8	23 14 19 23 24 24
Marias Pass	13A5	5250	1/30	52	14.6	10.8	12.2	11.8	24
UPPER YELLOWSTONE									
Canyon Cooke City Lake Camp Lodgepole, Wyo. Lupine #Aster Creek #Thumb Divide	10E3 10D7 10E4 9E1 10E1 10E8 10E7	7750 7400 7850 8200 7300 7700 7900	2/1 1/31 2/1 1/30 1/29	42 26 30 31 30	9.8 5.0 5.7 6.8 6.6	7.7 4.6 4.5 5.4 4.4 16.4 11.7	10.0 5.8 6.0 7.5 8.2 19.0 12.8	9.8** 6.1** 6.7** 8.5** 7.2* 16.5	14 12 13 3 16 39 11

Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.

\*\*\* Average for period of record.

# Adjacent Basin.



## MONTANA SNOW SURVEYS ABOUT FEBRUARY 1, 1959

					SNOW C	OVER M	EASUREM	ENTS	
MISSOURI				1959		ŧ	ast Rec		Total
DRAINAGE BASIN			Date	Snow	Water	Water	Conten	it (In.)	Years
AND	W		of	Depth	Content			15-Year	of
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	1958	1957	Average	Record
								1938-52	
LOWER YELLOWSTONE	(Wind R	iver)							
Big Warm	9F12	8800	1/22	23	4.7	3.7	5.3	-	4
Brooks Lake	loF8	9200		oned; 1	Jse Togw		ass		
Burroughs Creek	9F4	8800	1/26	40	10.4	6.1	7.3	11.0**	10
Dinwoodie	9Fl0	10000	1/27	27	6.3	6.0	6.7	8.6**	10
Dinwoodie Glacier	A	10500	1/30	27	6.3	-	-	-	-
Dry Creek	9 <b>F</b> 9	9500	1/27	18	3.9	2.8	3.5	4.6**	10
DuNoir	9 <b>F</b> 6	8750	1/22	21	4.3	2.7	4.5	6.3*	17
Geyser Creek	9 <b>F</b> 7	8500	1/23	17	4.2	2.3	4.2	5.5**	10
Little Warm	9F8	9500	1/23	38	10.1	7.5	9.3	11.9**	9
Sheridan R.S. #2	9F14	7500	1/22	17	3.3	2.9	4.2	-	4
T-Cross Ranch	9F3	8000	1/26	22	4.4	3.5	5.2	5.0%	18
Togwotee Pass	10F9	9600	1/29	75	20.9	15.1	16.9	19.2	23
Twenty Lakes	A	10500	1/30	12	2.0	-		_	<b>a</b>
LOWER YELLOWSTONE	(Popo A	gie Rive	er)						
Blue Ridge	8G2	9500	2/2	21	4.5	5.5	6.0	8.2*	17
Bruce's Camp	8 <b>G</b> 5	6500	$\frac{2}{3}$	11	2.1	1.6	0.6	_	3
Hobbs Park	9G3	10000	1/29	33	6.9	7.0	10.6	12.5**	10
Mosquito Park R.S.		9500	1/29	18	2.8	3.3	4.2	5.4%	15
Sawmill Glade	8 <b>G</b> l	8500	2/2	19	3.2	4.8	4.1	5.2*	17
South Pass	8G3	9000	$\frac{2}{3}$	26	5.0	7.1	9.0	9.8%	17
St. Lawrence R.S.	9Fll	9000	1/28	12	2.0	2.0	3.6	4.6*	15
Trout Creek	9G2	8400	1/29	20	2.9	3.2	3.6	3.5**	10
LOWER YELLOWSTONE	(Owl Cr	eek)					Management of the Control of the Con		
200	0770	0000	7 /20	00	۳ ۵	0.0	2.0	۲ ۵۰۰۰	7.0
Beavers Mill	9F2	8900	1/30	22	5.0	2.2	3.2	5.0**	10
Owl Creek	8F1	8700	1/30	17	2.9	2.4	2.2	3.7**	10
LOWER YELLOWSTONE	(Greybu	ll River	·)				Appropriate to the state of the	- Option to the state of the st	
Timber Creek #2	9 <b>E</b> 3	8800	1/28	7	1.3	2.1	2.0	1.9**/	7
Wood River #2	9 <b>F</b> 1	8000	1/29	16	3.2	3.4	2.6	_	4
			, ,			-			
							The state of the s		

<sup>\*</sup> Less than 15 years in 1938-52 period. Average for 15 years nearest the base period. \*\* Average for period of record.

<sup>\*\*/</sup>Timber Creek #1 abandoned. Timber Creek #2 average obtained from relationship of old and new courses.



## MONTANA SNOW SURVEYS ABOUT FEBRUARY 1, 1959

				7000	SNOW C	,	EASURE		
MISSOURI DRAINAGE BASIN			Date	1959 Snow	Water	1	ast Rec	ord nt (In.)	_ Total Years
AND SNOW COURSE	No.	Elev.	of Survey		Content		1957	15-Year Average 1938-52	of Record
LOWER YELLOWSTONE (S	hoshon	e River	·)						
#Carter Mt. East Entrance Sylvan Pass Togwotee Pass	9E4 10E6 10E5 10F9	7800 7000 7100 9600	1/28 1/30 1/30 1/29	9 32 39 75	1.4 7.3 9.6 20.9	3.1 7.3 8.1 15.1	4.0 8.9 10.1 16.9	8.7** 10.2* 19.2	2 10 15 23
LOWER YELLOWSTONE (N	owood	Creek)							
Cold Springs Camp Medicine Lodge Lks. Munkres Pass Onion Gulch Tensleep Lake Tensleep R.S. Tyrell R.S.	7E25 7E24 7E8 7E27 7E26 7E7 7E35	8700 9500 9700 8100 9075 8300 8300	1/27 1/27 2/1 2/1 1/31 1/31	27 37 33 31 38 31 31	6.5 9.2 8.8 7.6 9.1 7.5 7.7	4.0 6.6 5.4 5.0 6.7 N.R 4.8	4.8 7.2 6.4 6.4 4.9 4.6	-  - - -	3 3 4 3 3 1 3
LOWER YELLOWSTONE (S	hell C	reek)							
Bald Mountain Beaver-Tongue Div. Bone-Spring Div. Granite Cr. Camp Granite Pass Ranger Creek Shell Creek	7E21 7320 7E18 7E22 7E17 7E4 7E23	9600 9200 9200 7800 8950 8800 9600	1/26 1/29 1/26 1/26 1/26 1/26	58 50 21 47 35 43	17.3 17.3 13.4 4.1 12.9 7.8 11.3	8.4 7.8 7.7 2.8 7.4 4.8 7.5	11.8 11.2 9.9 3.8 10.2 6.5 10.0	644 644 644 644	3 3 3 3 3 3 3
LOWER YELLOWSTONE (P	orcupi	ne Cree	k)						
Five-Springs Falls Medicine Wheel	7E31 7E30	7500 9000	1/30 1/27	33 53	8.5 16.3	2.4 6.8	2.6 9.0	- -	3

<sup>\*</sup> Less than 15 years in 1938-52 period. Average for 15 years nearest the base period. Average for period of record.

<sup>#</sup> Adjacent Basin.



## MONTANA SNOW SURVEYS ABOUT FEBRUARY 1, 1959

					SNOW C	OVER M	EASUREM	ENTS	
MISSOURI				1959		P	ast Rec	ord	Total
DRAINAGE BASIN			Date	Snow	Water		Conten		Years
AND			$ ext{of}$		Content		0	15-Year	of
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	1958	1957	Average 1938-52	Record
LOWER YELLOWSTONE (	Tongue l	River)							
Beaver-Tongue Div.	7 <b>E</b> 20	9200	1/26	58	17.3	7.8	11.2	-	3
Big Goose #2	7E32	7700	1/30	25	5.9	3.6	4.4	em	3
Bone-Spring Div.	7 <b>E</b> 18	9200	1/29	50	13.4	7.7	9.9	-	3
Burgess R.S. #2	7E33	7900	1/27	27	7.0	3.4	4.1		3
Dome Lake #2	7E34	8800	1/30	30 37	7.5	4.8	6.0	_	3
Gloom Creek Granite Pass	7E14 7E17	9300 8950	1/28 1/29	37	10.3	6.4	6.9	_	3
North Tongue	7E17	8800	1/27	47 39	12.9 11.0	7.4 N.R.	4.4	_	)
Sibley Lake	7E11	8000	1/26	33	8.6	5.5	5.4	_	2
Steamboat Point	7E10	7500	1/26	26	6.3	3.4	3.4		7 3
Sucker Creek	7E12	9000	1/28	37	10.2	6.3	6.3	_	3
Wood Rock G.S.	7E13	8500	1/28	33	8.5	4.9	6.0	_	3333333333333
LOWER YELLOWSTONE (	Powder I	River)							
Muddy Creek G.S.	7 <b>E2</b> 8	7500	2/1	15	3.9	2.3	2.2	_	3
Munkres Pass	7 <b>E</b> 8	9700	2/1	33	8.8	5.4	6.0	-	4
Onion Gulch	7E27	8100	2/1	31	7.6	5.0	6.4	-	3 7
Soldier Park	7E5	8700	2/1	20	4.6	3.0	1.6	2.9**	
Sour Dough	7 <b>E</b> 6	8500	2/2	24	5.5	3.8	3.8	-	3

<sup>\*\*</sup> Average for period of record.



					SNOW C		EASUREM		
COLUMBIA DRAINAGE BASIN			Date	1959 Snow	Water	+	ast Rec Conten		Total Years
AND			of		Content		COLLECT	15-Year	of
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	1958	1957	Average 1938-52	Record
KOOTENAI RIVER (ab	ove Lib	by, Mon	tana)						
Fernie	Can	3500	1/30	23	5.7	6.8	7.3	6.6*	19
Gray Creek	Can	5100	1/28	50	11.4	9.3	12.2	12.6**	10
Marble Canyon	Can	5000	1/30	52	11.9	9.5	13.7	11.5**	11
Nelson Creek	Can	3050	1/28	45	11.2	13.1	10.5	10.0%	20
New Fernie	Can	4100	1/30	46	11.9	10.7	10.9	11.5**	8
Sullivan Mine	Can	5100	1/29	45	9.6	8.9	8.2	10.0**	13
FLATHEAD RIVER						The control and the control an			
Basin Creek	13B14A	5000	1/27	23	5.2	5.9	3.4	7.1 <del>**</del>	8
Coyote Hill	13B10	4200	2/2	35	8.8	8.2	7.4	7.3**	12
Desert Mountain	13A2M	5600	1/30	51	13.1	8.2	9.1	10.1**	12
Holbrook	13B13A		1/27	31	8.2	6.4	4.9	7.4**	8
Marias Pass	13A5	5250	1/30	52	14.6	10.8	12.2	11.8	24
Spotted Bear Mt.	13B2M	7000	2/3	50	13.6	7.7	9.1	9.0%%	3
Trout Lake Twin Creeks	13A12M 13B11	3600 3580	2/4 2/4	51 43	13.4 11.6	9.1 7.1	8.0 7.3	11.1**	6
CLARK FORK		J) = =	/	42	aliante y		1.0	0,0	
Chessman Res.	1205	6200	1/29	11	2.3	2.3	1.2	3.3	23
Coyote Hill	13B10	4200	2/2	35	8.8	8.2	7.4	7.3**	11
Fish Lake Airstrip	-	5000	1/31	93	25.9	27.0	23.5	26.2**	7
Intergaard	1304	6450	2/2	19	4.2	5.6	3.8	5.1**	14
Lubrecht For. #6	13C8	5400	2/2	13	3.0	3.0	3.5	3.3**	7
Picnic Grounds	1206	6500	2/2	11	1.7	2.4	3.8	3.4**	14
Pipestone Pass	12D1	7200	2/2	12	2.2	3.2	3.2	2.9%	19
Southern Cross	1305	6500	2/2	13	2.7	4.3	4.0	4.1**	14
Storm Lake #2	1307	7780	2/3	36	8.8	7.9	7.6	8.4**	6
Stuart Mill	1306	6500	2/2	15	3.7	4.3	4.5	4.4%	14
Tenmile, Lower	1202	6250	2/1	20	4.6	3.9	4.4	4.8	23
Tenmile, Middle	1203	6800	2/1	32	7.8	6.4	5.8	7.0	24
Tenmile, Upper	1204	8000	1/31	40	10.6	8.2	7.7	8.8	24
TV Mountain	14B1	6800	2/2	62	- 1	10.6	11.2	10.9**	2
#Lookout BITTERROOT	15B2	5250	1/30	91	27.2	26.6	19.7	22.4	22
The state of the s	7.070	<b></b>	7 /00	بہ بہ	71 0		71 0		
Gibbons Pass #Moose Creek	13D2 13D16	7100 6200	1/30 1/28	55 43		14.4	14.8	15.2*	19
WIJOODE OT GEV	TJUTO	0200	1/20	45	TO*2	10.7	11.2	11.8**	13

<sup>\*</sup> Less than 15 years in 1938-52 period. Average for 15 years nearest the base period. \*\* Average for period of record. # Adjacent Basin.



## STATUS OF RESERVOIR STORAGE February, 1959

BASIN		USABLE	USAB	LE STORAG	E - 1000 .		
&c		CAPACITY				1938-52	
STREAM RE:	SERVOIR	1000 A.F.	1959	1958	1957	AVG.	YRS.
MISSOURI RIVER BASIN	- MON'I'ANA						
Beaverhead Lir	mo	84.0	20.0	26.7	6.4	64.5*	18
	bgen Lake	345.0	32.2 168.2	157.4	158.1	234.7	23
	nis Lake	41.0	38.5	34.8	38.4	34.0	23
	ddle Creek	8.0	4.2	3.7	3.1	3.6**	7
9	nyon Ferry	2043.0	1699.0	1575.0	1488.0	1332.0**	5
	user Lake	2045.0	1099.0	1717.0	1400.0	1)2.00	
	Lake Helena	62.5	60.1	59.0	62.5	46.2*	19
	ke Helena	10.4	9.8	9.2	10.4	8.3**	13
	lter Lake	81.9	59.1	76.7	78.8	53.3	21
	bson	105.0	27.61	29.0	39.6	59.6	23
	llow Creek	32.3		19.8	23.4	12.9	23
	shkun	32.0		12.3	16.5	15.6	23
	ber	1316.0		625.2	630.7	-	23 3 23
	ift	30.0		19.0	23.7	19.5	23
	ke Francis	112.0		94.2	90.0	72.8	23
- 0	kley Lake	5.8		4.6	3.7	4.2*	20
	. Peck 3/	19410.0	8909.0	7748.0	6019.0	11240.0%	18
	esno	127.2	29.3	55.9	75.1	56.2*	18
	lson	66.8	42.5	49.8	51.4	28.5	23
	stic Lake	20.8	11.4	7.4	6.0	8.0	23
	ngue River	73.9	15.4	9.0	10.8	10.0*	18
	erburne Lake	66.1	34.2	21.0	18.8	19.0	23
			7400		20.0		
MISSOURI RIVER BASIN	- WYOMING						
Charles Diagram	ee.i. Daii	1.1.0.0	000 0	167.0	700 0	061 =	01
	ffalo Bill	440.0	000.0	161.9	128.2	264.5	24
•	ysen	408.6AC	78.3	249.1	220.0	260.3**	7
	lot Butte	31.6	6.3	15.9	14.3	14.5	23
	ll Lake	152.0	56.3	66.5	67.8	66.7*	19
Belle Fourche Key	y Hole	190.0AC	0.0	1.9	14.1	13.3**	6

<sup>\*</sup> Less than 15 years in 1938-52 period. Average for 15 years nearest the base period. 
\*\* Average for period of record.

3/ Gross contents: Usable capacity less 617.0 A.F; minimum power pool 4,500 A.F.

AC Active capacity; USBR Billings.



#### STATUS OF RESERVOIR STORAGE February, 1959

BASIN		USABLE	USAB	USABLE STORAGE - 1000 ACRE FEET								
&		CAPACITY				1938-52						
STREAM	RESERVOIR	1000 A.F.	1959	1958	1957	AVG.	YRS.					
	14 Lot, 12 May 1990 1990 1990 1990 1990 1990 1990 199											
MISSOURI RIVER BA	ASIN - NORTH DAK	OTA										
Heart River Heart River Missouri River James River	Heart Butte Dickinson Garrison Lk. Jamestown	54.8AC 4.3AC 13805.0AC 20.0AC	42.9 3.7 2679.4 12.5	53.3 4.2 4448.0 10.4	43.7 3.2 535.2 4.7	53.4** 3.8** -	8 8 4 2					
MISSOURI RIVER BA	ASIN - SOUTH DAK	OTA										
Belle Fourche Cheyenne River Cheyenne River Grand River Missouri River Missouri River	Belle Fourche Angostura Deerfield Shadehill Ft. Randall Gavins Point Oahe	185.0AC 160.0AC 15.1AC 84.0AC 4900.0AC 385.0AC	32.0 46.4 8.6 71.4 1986.2 316.1	66.0 55.9 11.3 79.4 1552.0 325.1	37.0 27.8 8.2 133.4 1091.0 189.7	- 11.3** 134.4**	3355400					
Cheyenne River	Pactola	14.8AC	18.4	13.9	1.4	_	2					
COLUMBIA RIVER BA	ASIN - MONTANA											
Flint Creek S.Fk. Flathead Flathead River Flathead River 6 Flathead River 7		1791.0 42.8	28.3 2956.0 1194.0 23.7 28.7	19.9 2088.0 873.0 26.0 19.7	19.2 1802.0 850.0 30.0 28.5	22.9* 2199.0** 679.0 21.1* 36.8*	19 5 15 18 18					

AC Active capacity; USBR Billings.

<sup>\*</sup> Less than 15 years in 1938-52 period. Average for 15 years nearest the base period. \*\* Average for period of record.

<sup>6/</sup> Camas Reservoirs are shown as a sum of (4) small reservoirs on the west side of Flathead Lake located on Dry Creek and Little Bitterroot River.

<sup>7/</sup> Mission Valley Reservoirs are shown as a sum of (8) small reservoirs located south and east of Flathead Lake. Both Camas and Mission Valley reservoirs are operated by the Indian Irrigation Service.







Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"The Conservation of Water begins with the Snow Survey"